

Applicant: H. Washio, et al.
U.S.S.N.: 09/822,768
RESPONSE TO OFFICE ACTION
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REMARKS

Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration of the subject application based on the foregoing amendments and the following remarks.

Claims 1-52 are pending in the subject application.

Claims 1-52 stand rejected under 35 U.S.C. §103.

Claims 1, 11, 14, 16, 21 and 37 were amended to more distinctly describe the pre-charging circuit of the present invention. Claims 1 also was amended to more particularly describe the pre-charging voltage stabilizing section of the present invention.

The amendments to the claims are supported by the originally filed disclosure.

35 U.S.C. §103 REJECTIONS

Claims 1-52 stand rejected under 35 U.S.C. §103 as being unpatentable over the cited prior art for the reasons provided on pages 2-8 of the above-referenced Office Action. Because claims were amended in the instant amendment, the following discussion refers to the language of the amended claims, however, only those amended features specifically relied upon to distinguish the claimed invention from the cited prior art shall be considered as being made to overcome the cited reference. The following addresses the specific rejections provided in the above-referenced Office Action.

CLAIMS 1-10 & 16-20

Claims 1-10 and 16-20 stand rejected as being unpatentable over Murade [USP 6,531,996] for the reasons provided on pages 2-4 of the above referenced Office Action.

Applicants respectfully traverse.

As grounds for the rejection, and more particularly as to claims 1 and 16, the above-referenced Office Action provides that Murade discloses the invention substantially as claimed by Applicants except that the reference does not specifically teach a pre-charging voltage stabilization section for suppressing fluctuation in the pre-charging voltage that is provided on a preceding stage of the pre-charging circuit. The Office Action further asserts, however, that Murade teaches supplying the same pre-charging signal NRS from an external control circuit to two contacts via an external terminal that would allow all of the TFTs to turn on at the same time without any delay. It is further asserted that Murade also teaches that through the use of the external control circuit, it is possible to reduce the differences in contrast between the left and right areas of the screen. It is further asserted that it would have been obvious to one skilled in the art to use the external circuit of Murade for the purposes of supplying the appropriate proportion of pre-charging signals.

Applicants claim, claim 1, an image display device including *inter alia*, a pre-charging circuit and a pre-charging voltage stabilizing section. The pre-charging circuit writes a pre-charging voltage inputted in synchronism with a pre-charging control signal into the plurality of data signal lines in a predetermined period of time. The pre-charging voltage stabilizing section stabilizes a pre-charging voltage and supplies the stabilized pre-charging voltage as said pre-

charging voltage to the pre-charging circuit, so as to suppress fluctuation in said pre-charging voltage is provided on a preceding stage of said pre-charging circuit.

Applicants also claim, claim 16, an image display device which displays an image by writing a video signal with respect to a plurality of pixels disposed in a matrix via a plurality of data signal lines. Such an image display device includes a pre-charging circuit and a pre-charging voltage stabilizing section. The pre-charging circuit writes a pre-charging voltage inputted in synchronism with a pre-charging control signal into the plurality of data signal lines in a predetermined period of time before said video signal is written into said data signal lines. The pre-charging voltage stabilizing circuit stabilizes the pre-charging voltage so as to supply charges to the pre-charging circuit by the pre-charging voltage, the charges being not less than an amount of charges which was supplied to said data signal lines by said pre-charging circuit.

The present invention advantageously provides an image display device having a pre-charging function to (i) suppress an increase of power consumption, and to (ii) particularly improve a writing performance of writing a video signal into a data signal line, and a driving method of such an image display device. More specifically, by including the pre-charging voltage stabilizing section, fluctuation in a pre-charging voltage can be suppressed, and thus the data signal lines can be charged to a desired potential, and deterioration of image quality of the image display device can be suppressed. In addition, since the image display device does not require a current amplifying circuit, an increase of power consumption can be suppressed. See also page 13, line 20 through page 14, line 2; and page 15, line 3 through line 11 of the subject application.

It appears that what the Office Action is asserting; is that it would have been obvious to one skilled in the art to supply a pre-charging signal having an appropriate level and thus this teaching also teaches providing the pre-charging voltage stabilizing section as set forth in either of claims 1 or 16. Applicants would note that the Examiner has not explicitly stated or indicated where in Murade it can be argued that the reference inherently discloses or teaches providing the pre-charging voltage stabilizing section of the present invention. More specifically the Examiner has not cited any specific language or drawing figure in Murade, which discloses, teaches or suggest the problem described by Applicants as well as the particular solution disclosed and taught in the subject application.

This is not surprising as the circuitry in Murade is configured and arranged to deal with a different problem, as is explained in detail in col. 1, line 57-col. 2, line 37, namely the problem of signal propagation delay. When signal propagation delay occurs, the image signal varies depending on the location of the data line from left to right. Murade further points out that because of this the contrast becomes different between the left and right portions of the image displaying area because of this. This problem is attributed in Murade to the fact that the pre-charging signals is supplied from only one end of the image signal line and it is further indicated therein that the propagation delay and associated degradation becomes greater as the number of pixels and associated data lines is increased.

More particularly, Murade relates to an electro-optical apparatus and an electronic apparatus, and an object of Murade is to provide a liquid crystal device capable of displaying a high-quality image including no non-uniformity in contrast or color even when the scanning

direction is inverted (see column 2, lines 49-53 of Murade). The TFT array substrate described in Murade includes: a *precharging circuit for supplying a precharging signal having a predetermined voltage level to a plurality of data lines* before an image signal is supplied; a sampling circuit for sampling the image signal and supplying the resultant signal to the plurality of data lines; a data line driving circuit; and a scanning line driving circuit. The scanning line driving circuit supplies a scanning signal in the form of a pulse to the scanning lines in accordance with a clock signal CLY, an inverted clock signal CLY_{INV}, a start signal DY, and power supply voltages VDDY and VSSY, which are supplied from an external control circuit via external terminals.

In synchronization with the scanning signal generated by the scanning line driving circuit, the data line driving circuit in Murade generates a sampling circuit driving signal in accordance with a reference clock signal CLX, an inverted clock signal CLX_{INV}, a start signal DX, and power supply voltages VDDX and VSSX, which are supplied from the external control circuit via external terminals. In response to the sampling circuit driving signal, the sampling circuit samples any of image signals VID1-VID6 corresponding to the data lines and writes the resultant signals on the corresponding data lines.

It should be noted that in Murade, the precharging signal line 204 and the precharging circuit driving signal line 206 are connected to contacts 103a and 103d and contacts 103b and 103c, respectively, for connection to the external terminals 102. The same precharging signal NRS is supplied from the external control circuit to both contacts 103a and 103d via the external terminals, and the same precharging signal NRG is supplied to both contacts 103b and 103c.

In this structure of Murade, the precharging signal and the precharging circuit driving signal are supplied from two sides of the image displaying area to the TFTs. This allows all the TFTs to turn on at the same time without any delay regardless of the location of the data lines even if a large interconnection capacitance associated with the data lines is added to the precharging signal line 204 and the precharging circuit driving signal line 206. If the same signal is supplied from both the first and final stages of the precharging circuit 201 to at least either the precharging signal line 204 or the precharging circuit driving signal line 206, it is possible to reduce the difference in contrast between the left and right areas of the screen (see column 13, lines 13-67 of Murade).

Therefore, Murade does not disclose such a pre-charging that the pre-charging circuit receives a pre-charging voltage stabilized by a pre-charging voltage stabilizing section in synchronization with a pre-charging control signal, nor disclose that the stabilized pre-charging voltage is written into the data signal lines by the pre-charging circuit. More specifically, Murade merely discloses that a sampling circuit driving signal is generated in accordance with a reference clock signal and other signals, which are supplied from the external control circuit via external terminals, and in response to the sampling circuit driving signal, any of image signals VID1-VID6 are sampled and written on the corresponding data lines. Thus, unlike the present invention, in Murade, the pre-charging voltage stabilizing section is not deeply involved with pre-charging of data signal lines. Furthermore, as indicated above Murade relates to an electro-optical apparatus and an electronic apparatus allowing all of the TFTs to turn on at the same time without any delay, by supplying the precharging signal and the precharging circuit driving signal

from two sides of the image displaying area to the TFTs, and enabling reduction of the difference in contrast between the left and right areas of the screen. As such, Murade is totally different in object and effect from the present invention, providing an image displaying device having a pre-charging function to improve a writing performance of writing a video signal into a data signal line.

As indicated above, what Murade discloses and teaches to solve their problem is not controlling the pre-charging voltage being applied so as to avoid fluctuations; but rather Murade discloses and teaches connecting the pre-charging circuit from two sides of the data lines. In other words, Murade teaches applying the pre-charging signal to the two ends of the data lines. Therefore, the language from Murade being referred to in the Office Action as support for the rejection, merely reflects the outcome of having the pre-charging signal applied to the two ends of the data signal lines to deal with signal propagation delay; nothing more (e.g., see for example the discussion in col. 4, lines 14-44 of Murade).

Applicants would note that there does not appear to be a discussion anywhere in Murade that explicitly or inherently reveals or describes, nor do the drawing figures of Murade illustrate, the circuitry or structure of the external control circuit as well as specifics of its functionality. The Office Action also refers to language in Murade to the effect that this structure would allow all of the TFTs to turn on at the same time without any delay. Applicants would note that the TFTs referred to in the Office Action are the TFTs of the pre-charging circuit 201, not the TFTs 30 on the TFT array substrate 1 from which images are to be displayed.

In sum, Murade is completely silent as to the particular form and structure of the mechanism or circuitry that provides or generates the so-called pre-charging signal and which is provided or inputted to the pre-charging circuit. Furthermore, Murade does not refer to the problem disclosed in the subject application, nor the particular solution for stabilizing the pre-charging signal being generated and provided to the data signal lines. Rather, Murade merely discloses a structure in which the pre-charge signal being generated by the external control circuit is supplied to two sides of the data signal lines and thus merely teaches supplying a generated pre-charging signal to two sides. As such, it can hardly be said that Murade teaches providing the pre-charging voltage stabilization section of the present invention and as more particularly described in claims 1 and 16.

Claim 17, which depends from claim 16, adds the further limitation that the pre-charging stabilizing circuit includes a serially connected resistor and capacitor and that the capacitor supplies the pre-charging circuit with the charges. As grounds for the rejection, the Office Action refers to the features identified by reference numerals 201 and 70 in Murade. It should be noted that the feature identified by reference numeral 201 in Murade is the pre-charging circuit and the feature that is identified by reference numeral 70 is the storage capacitor that is added to each respective pixel electrode 11 (e.g., see col. 12, lines 61-65 of Murade). As such, neither of these features can correspond to the resistor and capacitor, or the claimed structure of the resistor and capacitor as set forth in claim 17. This should not be surprising as the Office Action admits that the pre-charging signal is generated by an external control circuit and not the pre-charging circuit and the capacitors added to the respective pixels. In addition, and as indicated herein, the

circuitry and structure of the external control circuit is not shown nor is it described anywhere in Murade. Ignoring for the moment that there is no discussion in the Office Action as to how the pre-charging circuit corresponds to the resistor of the claim, it also is clear from Fig. 1 in Murade that the capacitor 70 and the precharging circuit 201 are not serially connected and moreover such an arrangement is physically impossible.

The foregoing remarks are illustrative and Applicants submit that further of the features or elements that are asserted as corresponding to those of the claimed invention, in fact do not correspond to the elements or features of the claimed invention, at least because there is no motivation or teaching provided anywhere in Murade to utilize a feature illustrated therein in the manner of the present invention.

Applicants would respectfully submit that at least for the foregoing reasons each of claims 2-10 and 18-20 are considered to be distinguishable from that disclosed and taught in Murade. Moreover, Applicants submit that there is no teaching, suggestion or motivation offered anywhere in Murade to one skilled in the art to modify the circuitry described therein so as to yield the invention as set forth in any of claims 1-10 and 16-20.

It is respectfully submitted that claims 1-10 and 16-20 are patentable over the cited reference(s) at least for the foregoing reasons.

CLAIMS 11-15, 21-24, 37 & 39-43

Claims 11-15, 21-24, 37 and 39-43 stand rejected as being unpatentable over Murade in view of Suzuki [USP 6,369,786] for the reasons provided on pages 5-6 of the above referenced Office Action. Applicants respectfully traverse.

As indicated above in the remarks regarding the rejection of claims 1-10 and 16-20, Murade does not disclose, teach or suggest providing a pre-charging voltage stabilizing circuit of the present invention nor does Murade disclose, teach or suggest controlling the pre-charging signal being generated so as to avoid fluctuations in the pre-charge voltage as is described and taught in the subject application. This is not surprising as Murade is completely silent as to the circuitry/ mechanism or device that is used to generate the pre-charge signal.

It is respectfully submitted that the foregoing remarks distinguishing claims 1-10 and 16-20 from Murade also apply to distinguish the driving method as set forth in claims 11-15, the driving method of claims 21-24, and the image display device as set forth in claims 37 and 39-43. Therefore for at least this reason, Applicants believe that these claims are allowable of the cited combination of references.

As to Suzuki, this reference is being used for a limited purpose(s). Applicants would note that this secondary reference does not overcome the shortcomings indicated above regarding Murade. More specifically, there is no teaching anywhere in Suzuki that would have suggested or taught to one skilled in the art to modify the circuitry disclosed in Murade so as to yield the pre-charging voltage stabilization circuitry of the present invention.

Notwithstanding the foregoing, Applicants also make the following further observations as to the secondary reference, Suzuki. Suzuki relates to a matrix driving method and apparatus for current-driven display elements such as LED, ECD, EL, and so forth. In column 1, lines 55-67, indicated in the Office Action, Suzuki describes “by turning on or off the select switches by a control signal from a controller, a current is supplied as a display signal to a selected one of the signal electrodes SiE from a current source.”

In contrast, the *pre-charging voltage stabilizing section of the present invention is made up of current controlling means and charge holding means*. The charge is supplied from the charge holding means while the pre-charging control signal is working, and the pre-charging voltage supplied from the control signal generating circuit is applied to the charge holding means while the pre-charging control signal is not working, and only a necessary amount of current is flown into the charge holding means by using the current controlling means. Thus, power consumption can be reduced (see page 15, lines 12-24 of the subject application). Applicants also would submit that it can hardly be said that a controller and a control signal of Suzuki correspond to the pre-charging voltage stabilizing section of the present invention.

It is respectfully submitted that claims 11-15, 21-24, 37 and 39-43 are patentable over the cited reference(s) at least for the foregoing reasons.

CLAIMS 25-36 & 38

Claims 25-26 and 38 stand rejected as being unpatentable over Murade in view of Suzuki and further in view of Takeda, et al. [USP 5,223,824; "Takeda"] for the reasons provided on page 7 of the above referenced Office Action. Applicants respectfully traverse.

As indicated above in the remarks regarding the rejection of claims 1-10 and 16-20, Murade does not disclose, teach or suggest providing a pre-charging voltage stabilizing circuit of the present invention nor does Murade disclose, teach or suggest controlling the pre-charging signal being generated so as to avoid fluctuations in the pre-charge voltage as is described and taught in the subject application. This is not surprising as Murade is completely silent as to the circuitry/ mechanism or device that is used to generate the pre-charge signal.

It is respectfully submitted that the foregoing remarks distinguishing claims 1-10 and 16-20 from Murade also apply to distinguish the driving method as set forth in claims 26-36, and the image display device as set forth in claim 38. Therefore for at least this reason, Applicants believe that these claims are allowable of the cited combination of references.

As indicated above in the remarks regarding claims 11-15, 21-24, 37 and 39-43 Suzuki is being used for a limited purposes and that this secondary reference does not overcome the shortcomings noted above regarding Murade. More specifically, there is no teaching anywhere in Suzuki that would have suggested or taught to one skilled in the art to modify the circuitry disclosed in Murade so as to yield the pre-charging voltage stabilization circuitry of the present invention.

As to the tertiary reference Tekadea, this reference also is being used for a limited purpose and this reference does not overcome the shortcomings noted above regarding Murade.

It is respectfully submitted that claims 25-36 and 38 are patentable over the cited reference(s) at least for the foregoing reasons.

CLAIMS 44-52

Claims 44-52 stand rejected as being unpatentable over Murade in view of Suzuki and further in view of Mori, et al. [USP 5,243,202; "Mori"] for the reasons provided on pages 7-8 of the above referenced Office Action. Applicants respectfully traverse.

As indicated above in the remarks regarding the rejection of claims 1-10 and 16-20, Murade does not disclose, teach or suggest providing a pre-charging voltage stabilizing circuit of the present invention nor does Murade disclose, teach or suggest controlling the pre-charging signal being generated so as to avoid fluctuations in the pre-charge voltage as is described and taught in the subject application. This is not surprising as Murade is completely silent as to the circuitry/ mechanism or device that is used to generate the pre-charge signal.

It is respectfully submitted that the foregoing remarks distinguishing claims 1-10 and 16-20 from Murade also apply to distinguish the image display device as set forth in claims 44-52. Therefore for at least this reason, Applicants believe that these claims are allowable of the cited combination of references.

As indicated above in the remarks regarding claims 11-15, 21-24, 37 and 39-43 Suzuki is being used for a limited purposes and that this secondary reference does not overcome the

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shortcomings noted above regarding Murade. More specifically, there is no teaching anywhere in Suzuki that would have suggested or taught to one skilled in the art to modify the circuitry disclosed in Murade so as to yield the pre-charging voltage stabilization circuitry of the present invention.

As to the tertiary reference Mori, this reference also is being used for a limited purpose and this reference does not overcome the shortcomings noted above regarding Murade.

It is respectfully submitted that claims 44-52 are patentable over the cited reference(s) at least for the foregoing reasons.

The following additional remarks shall apply to each of the above.

As provided in MPEP 2143.01, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F. 2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F. 2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As provided above, the references cited, alone or in combination, include no such teaching, suggestion or motivation.

Furthermore, and as provided in MPEP 2143.02, a prior art reference can be combined or modified to reject claims as obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Additionally, it also has been held that if the proposed modification or combination would change the principle of

operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. Further, and as provided in MPEP-2143, the teaching or suggestion to make the claimed combination and the reasonable suggestion of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). As can be seen from the forgoing discussion regarding the disclosures of the cited references and the admitted prior art, there is no reasonable expectation of success provided in the reference or the admitted prior art. Also, it is clear from the foregoing discussion that the modification suggested by the Examiner would change the principle of operation of the device disclosed in the principal reference.

The Federal Circuit has indicated in connection with 35 U.S.C. §102 that in deciding the issue of anticipation, the trier of fact must identify the elements of the claims, determine their meaning in light of the specification and prosecution history, and identify *corresponding elements* disclosed in the allegedly anticipating reference (emphasis added, citations in support omitted). *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Company et al.*, 730 F. 2d 1452, 221 USPQ 481,485 (Fed. Cir. 1984). Notwithstanding that the instant rejection is under 35 U.S.C. §103, in the present case the Examiner has not shown that identified features of Murade corresponds, as that term is used above by the Federal Circuit, in any fashion to the allegedly equivalent feature in its entire claimed form as set forth in any of the independent claims of the present invention.

The Federal Circuit also has indicated that a prior art reference that gives only general guidance and is not all that specific as to particular forms of a claimed invention and how to

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achieve it, may make a certain approach obvious to try, but does not make the invention obvious. *Ex Parte Obukowicz*, 27 USPQ2d 1063, citing *In re O'Farrell*, 853 F.2d 894, 7 USPQ2d 1673,1681 (Fed. Cir. 1988).

As the Federal circuit has stated, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260,1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor. *Para-Ordance Mfg. v. SGS Importers Int'l, Inc.*, 73 F.2d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995).

It is respectfully submitted that for the foregoing reasons, claims 1-52 are patentable over the cited reference(s) and satisfy the requirements of 35 U.S.C. §103. As such, these claims are allowable.

It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.

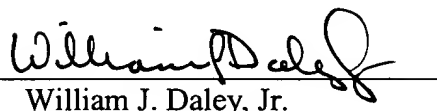
Applicants believe that additional fees are not required for consideration of the within Response. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed

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for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit
Account No. **04-1105**.

Respectfully submitted,
Edwards & Angell, LLP

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